REMARKS

The following remarks are responsive to the February 10, 2005 Final Office Action. Claims 1, 3, 4, 7, 9, 12, and 14 remain as previously presented and Claims 2, 5, 6, 8, 10, 11, 13, 15, and 16 remain as originally filed. Thus, Claims 1-16 are presented for further consideration.

Response to Rejection of Claims 1-16 Under 35 U.S.C. § 102(b)

In the February 10, 2005 Final Office Action, the Examiner rejects Claims 1-16 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,974,544 issued to Jeffries et al. ("Jeffries"). For the reasons stated below, Applicant submits that Jeffries does not disclose all the limitations of the pending claims.

<u>Claim 1</u>

Claim 1 recites (emphasis added):

> 1.   A method of transferring a non-time-critical, error-intolerant data segment stored on a disk drive, which is responsive to a set of data transfer commands generated by a host processor and which is operating in a mode optimized for transferring time-critical, error-tolerant streaming data segments stored or to be stored on the disk drive, the method comprising:
>
> sending a sequence of data transfer commands generated by the host processor to the disk drive **to transfer a respective sequence of time-critical, non-redundantly-recorded, error-tolerant streaming data segments** at a required data transfer rate;
>
> selectively interposing a first data transfer command into the sequence of data transfer commands, the first data transfer command **initiating a first transfer of the non-time-critical, error-intolerant data segment from a first storage location;**
>
> transmitting a data transfer error signal generated by the disk drive to the host processor, the data transfer error signal having a state that indicates whether any data transfer errors have occurred with respect to the first transfer of the non-time-critical, error-intolerant data segment; and
>
> selectively interposing a second data transfer command into the sequence of data transfer commands, the second data transfer command **initiating a second transfer of the non-time-critical, error-intolerant data segment from a second storage location,** thereby utilizing storage redundancy to achieve an accuracy required for the non-time-critical, error-intolerant data segment while maintaining the required data transfer rate of the sequence of time-critical, non-redundantly-recorded, error-tolerant streaming data segments.

As described by the present application (see, e.g., pages 1-4), disk drives used to record and playback video data typically transfer two types of data segments: (i) audiovisual ("AV") data segments, which are continually transferred at a required data transfer rate but are tolerant of

some loss in data accuracy (i.e., AV data segments are time-critical, error-tolerant streaming data segments), and (ii) information technology ("IT") data segments, which require a high level of data accuracy, but which can be delayed (i.e., IT data segments are non-time-critical, error-intolerant data segments). The method recited by Claim 1 utilizes storage redundancy for the non-time-critical, error-intolerant data segments by transferring certain such data segments from a first storage location and a second storage location to achieve an accuracy required for the non-time-critical, error-intolerant data segments. The method recited by Claim 1 also maintains the required data transfer rate for the time-critical, error-tolerant streaming data segments which are not redundantly recorded. Thus, **the method recited by Claim 1 treats streaming AV data segments differently from IT data segments** by recording the streaming AV data non-redundantly and recording the IT data segments redundantly. By accessing redundant copies of the IT data segments while not doing so for AV data segments, the method recited by Claim 1 provides a desired data transfer rate for the streaming AV data segments and a desired accuracy for the IT data segments.

In contrast, Jeffries discloses a disk drive array redundancy system which **treats all data segments equally** and which does not include all the limitations recited by Claim 1. In particular, Jeffries does not disclose transferring sequences of "time-critical, non-redundantly-recorded, error-tolerant streaming data segments" (AV data segments) to maintain the required data transfer rate while utilizing storage redundancy for "non-time-critical, error-intolerant data segments" (IT data segments).

Applicant submits that the portions of Jeffries cited by the Examiner do not disclose the purported limitations recited by Claim 1. For example, the Examiner cites Jeffries at column 2, lines 23-45 as disclosing a disk drive "operating in a mode optimized for transferring time-critical, error-tolerant streaming data segments." However, this portion of Jeffries discloses a disk drive being used as a secondary memory source which transmits data (implicitly including processor instructions) into primary memory. If the disk drive transmitted any erroneous processor instructions into primary memory, the host processor would "crash" upon accessing this erroneous data. Thus, a disk drive in the context disclosed by Jeffries can not transfer erroneous data, and can not be described as "operating in a mode optimized for transferring time-critical, error-tolerant streaming data segments." Therefore, this cited portion of Jeffries does not conform to the claim language of Claim 1.

In addition, the Examiner cites Jeffries at column 50, line 63 – column 51, line 39 as disclosing "sending a sequence of data transfer commands generated by the host processor to the disk drive to transfer a respective sequence of time-critical, non-redundantly-recorded, error-tolerant streaming data segments." However, the sequence of commands disclosed by Jeffries is a sequence of read commands forming a scatter read operation intended to collect data from diverse segments of the disk drive into a single string of data. Merely skipping some intervening blocks during each read operation does not constitute error tolerance as recited by Claim 1, and Jeffries does not disclose or suggest that the data transferred to the host is error-tolerant. Therefore, this cited portion of Jeffries does not conform to the claim language of Claim 1.

Furthermore, the Examiner cites Jeffries at column 17, lines 3-44 as disclosing "utilizing storage redundancy to achieve an accuracy required for the non-time-critical, error-intolerant data segment while maintaining the required data transfer rate of the sequence of time-critical, non-redundantly-recorded, error-tolerant streaming data segments." However, the cited portion of Jeffries discloses reconstructing a failed stripe in a RAID system, which requires disk resources. Thus, the system disclosed by Jeffries does not reduce the disk drive processing to maintain the required data transfer rate, as recited by Claim 1. Jeffries also does not disclose selectively recording some data as redundant data and other data as non-redundant data in the disk drive. Jeffries also does not disclose transferring erroneous portions of the time-critical, error-tolerant data segments (e.g., AV data segments) to the host processor in order to maintain the data transfer rate of the error-tolerant data segments.

As discussed above, Applicant submits that Jeffries does not disclose all the limitations recited by Claim 1, so Claim 1 is patentably distinguished over Jeffries. Therefore, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 1 and pass Claim 1 to allowance.

Claims 2-6

Each of Claims 2-6 depends from Claim 1, so each of Claims 2-6 includes all the limitations of Claim 1, as well as other limitations of particular utility. For the reasons stated above with respect to Claim 1, Applicant submits that Claims 2-6 are patentably distinguished over Jeffries. Therefore Applicant respectfully requests that the Examiner withdraw the rejection of Claims 2-6 and pass these claims to allowance.

Claim 7

Claim 7 recites (emphasis added):

> 7.   A method of storing a non-time-critical, error-intolerant data segment on a disk drive, which is responsive to a set of data transfer commands generated by a host processor and **which non-redundantly stores time-critical, error-tolerant data segments** and which stores non-time-critical, error-intolerant data segments, the method comprising:
>
> > sending a first data transfer command generated by the host processor to the disk drive to write the non-time-critical, error-intolerant data segment on the disk drive;
> >
> > **writing the non-time-critical, error-intolerant data segment at a first storage location**; and
> >
> > **writing the non-time-critical, error-intolerant data segment at a second storage location different from the first storage location**.

As discussed above with regard to Claim 1, Applicant submits that Jeffries does not disclose all the limitations recited by Claim 7, so Claim 7 is patentably distinguished over Jeffries. Therefore, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 7 and pass Claim 7 to allowance.

Claims 8-11

Each of Claims 8 and 9 depends from Claim 7, and each of Claims 10 and 11 depends from Claim 9. Therefore, each of Claims 8-11 includes all the limitations of Claim 7, as well as other limitations of particular utility. For the reasons stated above with respect to Claim 7, Applicant submits that Claims 8-11 are patentably distinguished over Jeffries. Therefore Applicant respectfully requests that the Examiner withdraw the rejection of Claims 8-11 and pass these claims to allowance.

Claim 12

Claim 12 recites (emphasis added):

> 12.   A method of transferring a non-time-critical, error-intolerant data segment stored on a disk drive, which is responsive to a set of data transfer commands generated by a host processor and which is operating in a mode optimized for transferring time-critical, error-tolerant streaming data segments stored or to be stored on the disk drive, the method comprising:
>
> > sending a sequence of data transfer commands generated by the host processor to the disk drive **to transfer a respective sequence of time-critical, non-redundantly-recorded, error-tolerant streaming data segments** within a data transfer bandwidth less than a maximum bandwidth for the disk drive;
> >
> > selectively interposing a first data transfer command into the sequence of data transfer commands, the first data transfer command **initiating a first transfer of the non-time-critical, error-intolerant data**

segment from a first storage location, the first transfer of the non-time-critical, error-intolerant data segment occurring within a remaining bandwidth that is a difference between the maximum bandwidth and the data transfer bandwidth;

transmitting a data transfer error signal generated by the disk drive to the host processor, the data transfer error signal having a state that indicates whether any data transfer errors have occurred with respect to the first transfer of the non-time-critical, error-intolerant data segment; and

selectively interposing a second data transfer command into the sequence of data transfer commands, the second data transfer command **initiating a second transfer of the non-time-critical, error-intolerant data segment from a second storage location**, thereby utilizing storage redundancy to achieve an accuracy required for the non-time-critical, error-intolerant data segment while maintaining the data transfer bandwidth for the sequence of time-critical, non-redundantly-recorded, error-tolerant streaming data segments.

As discussed above with regard to Claim 1, Applicant submits that Jeffries does not disclose all the limitations recited by Claim 12, so Claim 12 is patentably distinguished over Jeffries. Therefore, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 12 and pass Claim 12 to allowance.

Claim 13

Claim 13 depends from Claim 12, so Claim 13 includes all the limitations of Claim 12, as well as other limitations of particular utility. For the reasons stated above with respect to Claim 12, Applicant submits that Claim 13 is patentably distinguished over Jeffries. Therefore Applicant respectfully requests that the Examiner withdraw the rejection of Claim 13 and pass Claim 13 to allowance.

Claim 14

Claim 14 recites (emphasis added):

14.   A video recording system to record and playback non-time-critical, error-intolerant data segments and time-critical, error-tolerant streaming data segments using a disk drive responsive to a set of data transfer commands and optimized for transferring time-critical, error-tolerant streaming data segments at a required data transfer rate, the video recording system comprising:

a user interface that receives user input;

a video input interface that receives an external video data stream for a selected video program segment and that generates time-critical, error-tolerant streaming data segments;

a video output interface that is connectable to a display device; and

a data management system that comprises:

at least one data buffer that receives, non-redundantly stores, and transmits time-critical, error-tolerant streaming data segments; and

a host processor that generates a sequence of data transfer commands sent to the disk drive to **transfer a respective sequence of time-critical, non-redundantly-recorded, error-tolerant streaming data segments at the required data transfer rate**; that selectively interposes a first data transfer command into the sequence of data transfer commands, the first data transfer command **initiating a first transfer of a non-time-critical, error-intolerant data segment from a first storage location**; that receives a data transfer error signal generated by the disk drive, the data transfer error signal having a state that indicates whether any data transfer errors have occurred in the first transfer of the non-time-critical, error-intolerant data segment; and that selectively interposes a second data transfer command into the sequence of data transfer commands, the second data transfer command **initiating a second transfer of the non-time-critical, error-intolerant data segment from a second storage location**, thereby utilizing storage redundancy to achieve an accuracy required for the non-time-critical, error-intolerant data segment while maintaining the required data transfer rate of the sequence of time-critical, non-redundantly-recorded, error-tolerant streaming data segments.

As discussed above with regard to Claim 1, Applicant submits that Jeffries does not disclose all the limitations recited by Claim 14, so Claim 14 is patentably distinguished over Jeffries. Therefore, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 14 and pass Claim 14 to allowance.

Claims 15 and 16

Each of Claims 15 and 16 depends from Claim 14. Therefore, each of Claims 15 and 16 includes all the limitations of Claim 14, as well as other limitations of particular utility. For the reasons stated above with respect to Claim 14, Applicant submits that Claims 15 and 16 are patentably distinguished over Jeffries. Therefore Applicant respectfully requests that the Examiner withdraw the rejection of Claims 15 and 16 and pass these claims to allowance.
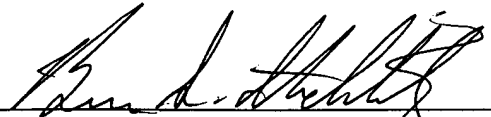
Summary

For the foregoing reasons, Applicant submits that Claims 1-16 are in condition for allowance, and Applicant respectfully requests such action.

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Respectfully submitted,

Dated: _____4/11/05_____   By: _____

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